

WHAT IS CLAIMED IS:

1. Thermal transfer material comprising:  
a support;  
a release layer overlaid on said support; and  
5 a transfer layer, overlaid on said release layer in a peelable manner, having thermoplasticity for thermal adhesion, and adapted to forming an image therein.
2. Thermal transfer material as defined in claim 1, wherein said transfer layer includes thermoplastic resin,  
10 softened or melted when said transfer layer is heated through said support, for adhesion of said transfer layer to image receiving material.
3. Thermal transfer material as defined in claim 2, wherein said transfer layer is a coloring transfer layer  
15 colorable by being exposed and then pressurized.
4. Thermal transfer material as defined in claim 2, wherein said transfer layer has ink receptivity.
5. Thermal transfer material as defined in claim 2, wherein said coloring transfer layer is colorable in a  
20 predetermined color by application of heat.
6. Thermal transfer material as defined in claim 3, wherein said coloring transfer layer includes developer agent and plural micro capsules distributed uniformly;  
said micro capsules include dye precursor, photo-setting  
25 resin and photo polymerization initiator, said photo-setting resin and said photo polymerization initiator harden said micro capsules upon application of light, and said dye precursor flows by pressurization out of unhardened remainder of said micro capsules, and reacts upon said developer agent  
30 to develop a predetermined color.
7. A thermal transfer material as defined in claim 6,

wherein said predetermined color at least comprises three primary colors, said micro capsules comprise first, second and third types associated with respectively said three primary colors, and said micro capsules of said types are  
5 hardened by light respectively of colors complementary to said primary colors.

8. A thermal transfer material as defined in claim 7, wherein said first, second and third types of said micro capsules are mixed in said coloring transfer layer.

10 9. A thermal transfer material as defined in claim 7, wherein said coloring transfer layer is constituted by first, second and third regions arranged cyclically in a longitudinal direction of said support, and said regions include respectively one of said first, second and third  
15 types of said micro capsules.

10. Thermal transfer material as defined in claim 4, wherein said transfer layer includes porous ink receiving substance.

11. A thermal transfer material as defined in claim 5,  
20 wherein said support has a continuous shape, said transfer layer comprises at least three thermosensitive coloring layers for developing colors different therebetween, and said thermosensitive coloring layers are arranged in sequence in a longitudinal direction of said support in a peelable  
25 manner.

12. A thermal transfer material as defined in claim 5, wherein said thermosensitive coloring layers have an equal length in said support longitudinal direction.

13. A thermal transfer material as defined in claim 5,  
30 wherein said transfer layer comprises at least first, second and third thermosensitive coloring layers overlaid on one

another in sequence from said release layer, for developing one of three primary colors, said thermosensitive coloring layers being heated through said support for image recording in sequence;

5        said first thermosensitive coloring layer is disposed closest to said support, said second thermosensitive coloring layer is disposed next closest to said support, said first and second thermosensitive coloring layers have optical fixability in response to electromagnetic rays in a  
10    predetermined wavelength range;

      said third thermosensitive coloring layer is disposed farthest from said support, and includes said thermoplastic resin, and said thermoplastic resin is heated to a glass transition point thereof upon image recording of said third  
15    thermosensitive coloring layer finally.

      14. Thermal transfer material as defined in claim 13, wherein said support and said release layer are transparent for transmitting said electromagnetic rays.

      15. Thermal transfer material as defined in claim 14,  
20    further comprising a heat resistant layer overlaid on said support in a surface thereof opposite to said release layer, and transparent for transmitting said electromagnetic rays.

      16. Thermal transfer material as defined in claim 15, wherein said first, second and third thermosensitive coloring  
25    transfer layers include first coloring substance and plural micro capsules distributed uniformly, said micro capsules include second coloring substance, and said second coloring substance thermally reacts upon said first coloring substance to develop said predetermined color.

30        17. Thermal transfer material as defined in claim 16, wherein said first coloring substance in said first and

second thermosensitive coloring layers is coupler, and said second coloring substance therein is diazonium compound that is photochemically decomposable.

18. Thermal transfer material as defined in claim 16,  
5 wherein said first coloring substance in said third thermosensitive coloring layer is developer agent, and said second coloring substance therein is leuco dye.

19. A printing method in which thermal transfer material is used;

10 wherein said thermal transfer material comprises a support, a release layer overlaid on said support, and a transfer layer, overlaid on said release layer, and having thermoplasticity;

said printing method comprising steps of:

15 forming an image in said transfer layer;

placing said transfer layer on image receiving material after said image is formed; and

heating and pressurizing said thermal transfer material in a direction from said support while said transfer layer is  
20 placed on, so as to transfer said transfer layer to said image receiving material by adhesion of said transfer layer peeled from said release layer.

20. A printing method in which thermal transfer material is used;

25 wherein said thermal transfer material comprises a support, a release layer overlaid on said support, and a coloring transfer layer, overlaid on said release layer, having thermoplasticity, and colorable by being exposed and then pressurized;

30 said printing method comprising steps of:

forming a latent image by exposing said coloring

transfer layer;

placing said coloring transfer layer on image receiving material after said latent image is formed; and

heating and pressurizing said thermal transfer material  
5 while said coloring transfer layer is placed on, so as to  
visibilize said latent image and transfer said coloring  
transfer layer to said image receiving material.

21. A printing method in which thermal transfer material is used;

10 wherein said thermal transfer material comprises a  
support, a release layer overlaid on said support, and an ink  
receiving transfer layer, overlaid on said release layer, and  
having thermoplasticity and ink receptivity;

said printing method comprising steps of:

15 recording an image to said ink receiving transfer layer  
with ink;

placing said ink receiving transfer layer on image receiving material after said image is recorded; and

heating and pressurizing said thermal transfer material  
20 while said ink receiving transfer layer is placed on, so as  
to transfer said ink receiving transfer layer to said image  
receiving material.

22. A printing method in which thermal transfer material is used;

25 wherein said thermal transfer material comprises a  
support, a release layer overlaid on said support, and a  
thermosensitive coloring transfer layer, overlaid on said  
release layer, colorable in a predetermined color in response  
to application of heat, and having thermoplasticity;

30 said printing method comprising steps of:

placing said thermosensitive coloring transfer layer on

image receiving material; and

heating and pressurizing said thermal transfer material while said thermosensitive coloring transfer layer is placed on, so as to record an image thermally in said  
5 thermosensitive coloring transfer layer and transfer said thermosensitive coloring transfer layer to said image receiving material.

23. A printing method as defined in claim 22, wherein said support has a continuous shape, said thermosensitive  
10 coloring transfer layer comprises first, second and third thermosensitive coloring transfer layers, overlaid on said release layer, arranged cyclically at a regular pitch, for developing one of three colors different therebetween, said  
15 first and second thermosensitive coloring transfer layers having optical fixability in response to electromagnetic rays in a predetermined wavelength range.

24. A printing method as defined in claim 23, wherein said transferring step comprises first, second and third  
20 transferring steps for transferring said first, second and third thermosensitive coloring transfer layers to said image receiving material in sequence to overlie on one another;

further comprising steps of:

photochemically fixing said first thermosensitive coloring transfer layer being transferred between said first  
25 and second transferring steps; and

photochemically fixing said second thermosensitive coloring transfer layer being transferred between said second and third transferring steps.

25. A printing method in which thermal transfer  
30 material is used;

wherein said thermal transfer material comprises a

support, a release layer overlaid on said support, and first, second and third thermosensitive coloring transfer layers, overlaid on said release layer, arranged cyclically at a regular pitch, for developing one of three colors different therebetween, said first and second thermosensitive coloring transfer layers having optical fixability in response to electromagnetic rays in a predetermined wavelength range, said first, second and third thermosensitive coloring transfer layers having thermoplasticity;

10        said printing method comprising steps of:

         heating and pressurizing said first and second thermosensitive coloring transfer layers for image recording thereto;

         photochemically fixing said first and second  
15 thermosensitive coloring transfer layers after said image recording;

         heating and pressurizing said third thermosensitive coloring transfer layer for image recording thereto and for transferring said third thermosensitive coloring transfer  
20 layer to image receiving material; and

         heating and pressurizing said first and second thermosensitive coloring transfer layers for transferring said first and second thermosensitive coloring transfer layers to said image receiving material after fixation, to  
25 overlie on said third thermosensitive coloring transfer layer.

26.     A printing method in which thermal transfer material is used;

         wherein said thermal transfer material comprises a  
30 support, a release layer overlaid on said support, and first, second and third thermosensitive coloring transfer layers,

overlaid on one another in sequence from said release layer,  
for developing one of three colors, said first  
thermosensitive coloring transfer layer is disposed closest  
to said support, said second thermosensitive coloring  
5 transfer layer is disposed next closest to said support, said  
first and second thermosensitive coloring transfer layers  
have optical fixability in response to electromagnetic rays  
in a predetermined wavelength range, said third  
thermosensitive coloring transfer layer is disposed farthest  
10 from said support, and includes said thermoplastic resin, and  
said thermoplastic resin is heated to a glass transition  
point thereof upon image recording of said third  
thermosensitive coloring transfer layer;

said printing method comprising steps of:

15 heating and pressurizing said first thermosensitive  
coloring transfer layer for image recording thereto;

photochemically fixing said first thermosensitive  
coloring transfer layer after said image recording;

heating and pressurizing said second thermosensitive  
20 coloring transfer layer for image recording thereto after  
said first thermosensitive coloring transfer layer is  
fixed;

photochemically fixing said second thermosensitive  
coloring transfer layer after said image recording;

25 after said second thermosensitive coloring transfer  
layer is fixed, heating and pressurizing said third  
thermosensitive coloring transfer layer for image recording  
thereto and for transferring said first, second and third  
thermosensitive coloring transfer layer to image receiving  
30 material.

27. A printer usable with thermal transfer material;



wherein said thermal transfer material comprises a support, a release layer overlaid on said support, and a coloring transfer layer, overlaid on said release layer, having thermoplasticity, and colorable by being exposed and  
5 then pressurized;

said printer comprising:

a feeder for feeding said thermal transfer material along a feeding path;

an exposure head, disposed in a feeding path, for  
10 forming a latent image by exposing said coloring transfer layer; and

a thermal head, disposed in said feeding path and downstream from said exposure head, for heating and pressurizing said thermal transfer material by contacting  
15 said support while said coloring transfer layer is placed on image receiving material after said latent image is formed, so as to visibilize said latent image and transfer said coloring transfer layer to said image receiving material.

28. A printer as defined in claim 27, wherein said  
20 coloring transfer layer includes thermoplastic resin, developer agent and plural micro capsules distributed uniformly, said micro capsules include dye precursor, photo-setting resin and photo polymerization initiator, said dye precursor is colorable in a predetermined color, and said  
25 photo-setting resin is hardened by light of a color complementary to said predetermined color;

said exposure head exposes said thermal transfer material by light of said complementary color, for hardening part of said photo-setting resin, to disable part of said dye  
30 precursor from developing color;

said thermal head destroys said micro capsules for

causing unhardened remainder of said dye precursor to develop color by reaction upon said developer agent with unhardened remainder of said photo-setting resin.

29. A printer usable with thermal transfer material;  
5 wherein said thermal transfer material comprises a support, a release layer overlaid on said support, and an ink receiving transfer layer, overlaid on said release layer, and having thermoplasticity and ink receptivity;

said printer comprising:

10 a feeder for feeding said thermal transfer material along a feeding path;

an ink jet recording head, disposed in a feeding path, for recording an image to said ink receiving transfer layer with ink; and

15 a thermal head, disposed in said feeding path and downstream from said ink jet recording head, for heating and pressurizing said thermal transfer material by contacting said support while said ink receiving transfer layer is placed on image receiving material after said image is  
20 recorded, so as to transfer said ink receiving transfer layer to said image receiving material.

30. A printer usable with thermal transfer material;

wherein said thermal transfer material comprises a support, a release layer overlaid on said support, and a  
25 thermosensitive coloring transfer layer, overlaid on said release layer, colorable in a predetermined color in response to application of heat, and having thermoplasticity;

said printer comprising:

a feeder for feeding said thermal transfer material  
30 along a feeding path; and

a thermal head, disposed in said feeding path, for

heating and pressurizing said thermal transfer material by contacting said support while said coloring transfer layer is placed on image receiving material, so as to record an image thermally in said coloring transfer layer and transfer said  
5 coloring transfer layer to said image receiving material.

1. The method of claim 1, wherein the thermal transfer material is a thermal transfer dye.